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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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PROGRESS OF GUANGDONG NUCLEAR PLANT REVIEWED

HK020401 Beijing RENMIN RIBAO in Chinese 28 Sep 84 p 2

[Newsletter by reports Liu Xieyang and Li Wen: "China's Large Nuclear Power Station Is Beginning To Take Shape--On a Visit to the Worksite of the Guangdong Nuclear Power Station"]

[Text] Driving eastwards from Shenzhen to the Maling Angle of Daya Bay on the broad asphalt road 70 km long, we saw some power transmission lines already erected on the hills, rising and falling and stretching for some distance ahead. At Dakeng Village, which is surrounded by mountains on three sides with one side open to the sea, we could hear the rumble of large-scale drilling machines, loading machines and bulldozers, breaking the long silence of this bay. Almost half the hilltop has been leveled. In front of us there was a small but spacious artificial plain. Looking further ahead, we could see a newly built large breakwater several hundred meters long. China's largest nuclear power station is to be built here.

The Guangdong Nuclear Power Station is a large-scale nuclear power station to be built through the joint investment of the Guangdong Provincial Nuclear Power Investment Company Limited, and the technology and equipment purchased from foreign firms. This will be a double generating set nuclear power station, using the pressurized water reactor system. Its general power will be 1.8 million kW and the annual generating capacity will be 10 billion kWh, equal to 70 percent of present total generating capacity of Guangdong Province. The first generating set is to go into operation by 1 January 1990, and the second set to be completed in June the same year.

Presently construction of the nuclear power station is being stepped up, and negotiations on various contract items and preconstruction preparations are progressing smoothly. The construction of the entire project will start formally at the beginning of next year.

Peng Shilu, vice minister of water resources and electric power and chairman of the board of the Guangdong Nuclear Power Joint Venture Company Limited, told reporters that most of the funds needed for building this nuclear power station have been obtained from loans. Both sides of the joint venture paid money for shares. The Chinese side holds 75 percent of the shares and the Hong Kong side holds 25 percent. The money needed for the investment other than shares will be collected by the Bank of China. The loans will be paid

back in 15 years by selling electricity (to Hong Kong). Under the present circumstances where the state is short of construction funds, this is undoubtedly an effective and feasible method. Of course, the cost and progress of building this project should be strictly controlled and further efforts should be made to seek low-interest loans in order to reduce the total investment and shorten the period of repaying debts.

Peng Shilu told us with a smile that time means money and efficiency means life. This is especially so in building a nuclear power station. After calculation, we find that every second of delay will result in a loss of $15. If the project is delayed for 1 year, there will be a loss of $400 million in paying interest on the loans. Racing against time, both the leaders and workers of the nuclear power station have been working intensely with a high fighting spirit. A series of measures have been adopted to insure that the project will be completed within the set time limit. All contracts will be strictly fulfilled in every working procedure including designing, building, and the supply, installment, and trial of equipment. Those who fail to fulfill the contracts will be held responsible and be subjected to economic sanctions. Some people will be sent abroad to supervise the execution of relevant contracts so these contracts can also be fulfilled as scheduled. Scientific management will be carried out and the system of employing staff and workers on a contract basis will be adopted by this company. The power of the organs at every level will be transferred to those at the next lower level. At each level there will be only one person taking charge of the work and no orders will be given from any higher levels bypassing the levels in between, so that responsibility, power and interests can be clarified and the phenomena of arguing over trifles and shirking responsibilities can be avoided. The method of inviting bids has been adopted in the civil engineering, installation and construction of the nuclear power station. The earthwork project has been contracted to the Jilin International Economic Cooperation Company and the Jilin Metallurgical and Mining Project Company. Over the past 2 months some 600,000 cubic meters of earth and stone have been removed from the mountains to reclaim land on the sea. The original plan can be expected to be fulfilled 2 months ahead of schedule. The high speed of construction has also been spoken highly of by the foreign experts working there.

This is the first time China has built a large-scale nuclear power station such as this. In order to gain experience, the Ministry of Machine-building Industry, the Ministry of Nuclear Industry, and the Ministry of Electronics Industry have all sent capable engineers and technicians to take part in the construction of this project. In the course of cooperation, the foreign firms are required to help China's engineers and technicians gradually grasp the techniques of designing, manufacturing, constructing, installing and debugging, by means of "handing over the key method without really handing over the key." The Chinese technicians, on the other hand, are required to study advanced foreign experiences conscientiously. As soon as the construction started, a number of Chinese technicians were sent to study abroad in order to increase their ability through practice. With full confidence Peng Shilu told the reporters: Through this practice, what we will get is not only a modern nuclear power station but also a contingent of workers capable of building nuclear power stations.

CSO: 5100/4103

AFP REPORTS FIRST UNDERGROUND NUCLEAR TEST IN YEAR

OW031656 Hong Kong AFP in English 1646 GMT 3 Oct 84

[Text] De Bilt, The Netherlands, Oct 3 (AFP) -- China today carried out an underground nuclear test at Lop Nor, near the Mongolian border, the Royal Netherlands Meteorological Institute here said.

It was China's "first major (nuclear) test" in more than a year and the explosion measured 5.5 on the open-ended Richter Scale, a force corresponding to 50 kilotons of TNT, the institute said.

The explosion occurred at 0600 GMT in Xinjiang Province, the institute said.

Meanwhile, the PRESS TRUST OF INDIA news agency, quoting sources at the seismic station of the Indian Department of Atomic Energy in Bombay, also reported the Chinese test.

According to Indian sources, however, the explosion had a force of between four and eight kilotonnes.

The institute, which regularly monitors underground tests in the Soviet Union, said that its monitoring of today's test may have been adversely affected by climatic and geological conditions.

CSO: 5100/4102

BRIEFS

ZHANG AIPING ON NUCLEAR WEAPONS--Beijing, 3 Oct (ZHONGGUO XINWEN SHE)-- Defense Minister Zhang Aiping, interviewed by a RENMIN RIBAO reporter a few days ago, spoke on events concerning the manufacture of China's first atomic bomb during a discourse on the modernization of the country's national defense. [Text] [HK03013 Beijing ZHONGGUO XINWEN SHE in Chinese 0231 GMT 3 Oct 84]

CSO: 5100/4103

NUCLEAR WASTE DUMPSITES SOUGHT

Manila BULLETIN TODAY in English 27 Sep 84 p 9

[Text] Tarlac and Zambales are being eyed as possible repository sites of radioactive waste materials from the Philippine nuclear power plant (PNPP) in Bataan, it was learned yesterday.

Edilberto A. Cabalfin, head of the Philippines Atomic Energy Commission (PAEC) radiation protection division, said that a national rad-waste management center will be set up to store low and medium radioactive waste materials from the plant.

The PAEC had earlier disclosed that Palawan and Mindoro were among the sites considered by a committee of experts to be the dumping site of radwastes. The group is scouting for a site with a stable geological formation. One of the most stable geological formations known, the salt dome, is not present in the Philippines, he said.

Cabalfin said that the center is expected to be built within 10 years from the start of the plant's operation. The waste storage building at the plant site can only hold radioactive wastes that will be generated for 10 years.

According to the PAEC publication released the other day, steel storage tanks within the storage building will be enclosed by concrete and steel to prevent accidental leaks of radioactive materials and will be properly guarded and isolated from population centers to ensure that residents and the environment are protected.

CSO: 5100/4301

PRODUCTION OF ISOTOPES FOR DISEASE TREATMENT SEEN

Bangkok THAI RAT in Thai 2 Jun 84 pp 2, 3

[Article: "Thailand to Produce Isotopes for Disease Treatment Cheaper than Abroad"]

[Text] Mr Aton Pathumsutr, secretary-general of the Institute for Peaceful Uses of Atomic Energy revealed that as of about February 1985, even the poor will have the privilege of the use of various radioactive isotopes in the treatment of disease. This is because the institute is proceeding to produce isotopes to serve various units both in and outside the institute at prices that are much lower than those for foreign imports. For example, radioactive isotopes of the Iodine 131-type in solution, with a radioactive strength of 10 milicuries, when produced by us costs only 500 baht for an amount that can cost as much as 4,500 baht if imported. We sell 1 millicurie of (Hippuran) 131 for 700 baht, while ordered from abroad it costs 4,100 baht. Physicians will be able to use these isotopes to treat diseases in various organs such as the kidneys, the liver, the spleen, the lungs, the heart and the brain and to treat various serious diseases such as cancer. Moreover, they are also useful in agriculture, for example, in studying the amount of radioactive material in plants and in measuring the amount of moisture in the soil.

Mr Aton also pointed out that the product, radioactive isotopes, will start to be used in the country itself as a service to the people so that those with low incomes can receive the benefits of treatment with it, while it is also being used to lower the trade deficit with foreign countries. Another important point is that some isotopes break down very quickly and cannot be stored for a long time, so it is necessary to produce them near the places where they are to be used. Otherwise, it is necessary to order larger amounts than are expected to be used, in order to compensate for their disintegration. This is one reason why the imported isotopes cost much more than those produced in the country. Finally, Mr Aton said that we expect to start producing Technesium 99 M isotapes and iodine and Iodine 131 first by beginning with Technesium 99 M which will be ready for production in February of 1984. We will be able to begin producing Iodine 131 at the start of Fiscal Year 1987, and the output will fully meet the needs of the domestic market.

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CSO: 5100/4368

ATOMIC ENERGY USE PREDICTED

Bangkok MATUPHUM in Thai 21 Apr 84 p 2

[Article: "In 10 Years Electrical Energy from Nuclear Power Plants"]

[Text] In 10 years Thailand will use nuclear power to produce electricity with the aid of a computerized system for use in economics, marketing, industry and other areas.

Mr Aton Pathumsutr, secretary-general of the Institute for Peaceful Uses of Atomic Energy spoke of the progress being made in the feasibility study, in regard to economics, of the use of nuclear power for production of electricity in the briefing room at the Ministry of Science, Technology and Energy at 10:30 am on 20 April. He said that at present Thailand is getting cooperation and aid from the International Atomic Energy Agency [IAEA] in planning a study for comparison of the use of other forms of energy in the production electricity with the use of a computerized system. From 24 April to 5 May of this year the IAEA will start helping implementation of the plan by sending three experts led by Mr Bennette, an American, to meet and consult with officials from various units concerned with this matter throughout Thailand. Their purpose is to gather the necessary data and put together a study of the framework of various uses of energy in the production electricity, future energy needs, and the appropriateness of the use of computerized nuclear power plants that are compatible with the computer programs called for by the above-mentioned plan.

Furthermore, Mr Aton disclosed that the Institute for Peaceful Uses of Atomic Energy has appointed a work unit consisting of six persons with qualifications in engineering and economics and including a representative from the National Economic and Social Development Board, one from the National Energy Administration, one representing the production side of the Electric Generating Authority of Thailand, and someone from the Institute for Peaceful Uses of Atomic Energy, as well as people from other units, to work together with the abovementioned group of experts.

Further questioning touched on how this plan would begin to bear fruit. Mr Aton said that he himself hoped that the results of the study would be the cutting edge for the start of something beneficial to the nation, that is, for implementing the plan for producing electricity by the use of atomic energy, and that it should take at least 10 years. Studies show that by 1995 the need

for electricity will increase greatly so that it will be necessary to make decisions on what energy sources are to be used, whether it be coal, oil, or water power. Investigation shows that we will have to examine two cases, that is, energy from coal that would be imported from abroad, or the use of nuclear energy, which anticipates a capacity for 900 to 1,000 megawatts in order to meet the needs of the entire country.

Mr Aton then pointed out the benefits of nuclear energy, saying it can also be used in industry. Results are immediate, as we can see from a demonstration at the Siam Craft Co. We find that a savings in energy yields a greater return. Moreover, it is still to be tried at the Saha Thai Fiber Container Co (Saha Union). Use of nuclear power in a galvanizing plant of Siam Craft Co would be expected to save up to 10 million baht per year if Siam Craft produces 100 tons per day, with even greater savings for higher production.

If the plan is to succeed it will require an average investment of $3,000 per kilowatt. When compared with the amount of megawatt units required by the factories, a total investment of nearly 1 billion baht is expected to be necessary.

MATUPHUM asked if the use of nuclear power would cause pollution of the environment. Mr Aton said that the plan provides for continuous monitoring by gathering samples from places where we are experimenting. Examination of the samples will tell if there is any danger, and if so, we can correct it quickly. In this we have the cooperation of the National Environmental Commission.

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CSO: 5100/4368

BRIEFS

LAW ON RADIOACTIVE METALS--Industry is changing its policy in regard to new radioactive ore, allowing those possessing it to request permission to export it because they are still unable to make use of it within the country. According to the notification issued by the Ministry of Industry on 29 December 1977, the policy has been one of not easing up in regard to the granting of permission to export out of the kingdom any radioactive ore (monazite) in one's possession on or after 21 December 1977. The Ministry of Industry has studied the question of use of radioactive ore (monazite) in the country. Thus far, it has not found use in the economy for energy or research purposes in any way. Therefore to help the economy and to relieve the anxiety of holders of the ore, the only recourse may be to export it and sell it abroad. Those possessing the radioactive ore (monazite) may request temporary permission to export it, until notified otherwise. [Text] [Bangkok SIAM RAT in Thai 16 Jun 84 p 11] 12710

CSO: 5100/4368

INTERATOMENERGO ROLE IN NUCLEAR POWER DISCUSSED

Prague SVET HOSPODARSTVI in Czech 9 Aug 84 p 6

[Article: "For the Efficient Development of Nuclear Power: In Its Second Decade of Existence Interatomenergo Focuses on Optimal Resource Utilization"]

[Text] Interatomenergo, an international economic association for the organization of cooperative production, equipment deliveries, and the provision of technical assistance in the construction of nuclear power plants, has begun this year the second decade of its existence and activity. In recent years this organization has attempted to contribute to the development of economic and technical cooperation in this very important area, in accordance with its mandates and functions. At the same time, it has become evident that Interatomenergo cannot at present fulfill some of these functions to the necessary extent (fulfilling the role of general contractor, providing maintenance services, etc.), because the requisite conditions for the performance of these functions (such as the allocation of economic resources) have not been created.

The experiences of recent years have also shown, however, that these functions and tasks, as they have been defined, in fact reflect the basic requirements for development of nuclear power in the participating CEMA member countries. Developing balances between requirements for and potential production of equipment, instrumentation, and materials for nuclear power plants; the preparation of proposals for specialization and production cooperation and for the expanded production of nuclear equipment; developing proposals for the joint planning of the production of this equipment; assuring necessary design and construction documentation for producers; organizing the cooperative production and deliveries of spare parts for nuclear power plants; coordinating specific tasks related to their startup; the organization of technical assistance for the construction of nuclear power plants in third countries; technical training and continuing education for operating and managerial personnel--these and other functions of this organization are necessary and indeed essential for the gradual establishment of a modern nuclear power industry within CEMA.

Cooperation with official CEMA organs, including direct contacts with the council secretariat and with the executive organ of the association, the general council, have been very important in recent years in fostering

the desired development of Interatomenergo activities. This cooperation has been mandated by a signed agreement which specifies that the activity of Interatomenergo will be closely tied to the activities of the pertinent CEMA agencies on questions related to fulfillment of the measures of the Comprehensive Program, of long-term priority cooperative programs, and of other measures in the area of material production. In this regard, the work plans of this association are tightly coordinated with the appropriate standing sectoral commissions of CEMA (the Standing CEMA Commission for Cooperation in the Peaceful Use of Nuclear Power, the Standing CEMA Commission for Cooperation in the Power Industry, etc.). The association presents an annual report on its activities and projected goals to the council secretariat.

The resolutions of the recent high-level economic conference of the CEMA member countries have provided an important stimulus to the development of Interatomenergo activity. These resolutions emphasize that structural changes in energy generation will be realized within CEMA and that there will be an expansion of forms of cooperation related to the priority development of nuclear power, the fuller utilization of all energy resources, both renewable and nonrenewable, etc. This gives Interatomenergo more opportunities to develop its activities in accordance with the actual requirements of the participating socialist economies.

Within this context it will be essential to work out the khozraschot functioning of the association, as provided for in its founding documents. The fulfillment of this requirement will require the development of appropriate conditions for the evolution of private economic activity. With this in mind, it has been proposed that Interatomenergo organize and consult, for a fee, during the formulation of design and technical documentation for the production of equipment and armatures for nuclear power plants, during the preparation and issuance of standard technical documentation, equipment lists, and the information manuals necessary for the maintenance of the nuclear power plant equipment. There is also a proposal for the establishment of an international spare parts center for nuclear power plants with VVER 440 reactors, of a training center for the servicing of power plants with VVER 1000 reactors and for the training of instructors for national training centers, and finally, for the establishment of an international construction combine.

Interatomenergo has also organized a series of seminars for the purpose of exchanging experiences in nuclear power generation and the production of nuclear power plant equipment. Representative themes of these seminars have included problems of the operational reliability of nuclear power plant equipment; quality control of the production of nuclear power plant equipment; assembly and operation; ways to shorten construction schedules and to speed up the installation of new power generation facilities; problems in the construction of earthquake-tolerant nuclear power plants, etc. The association also participates in specialized shows in the CEMA member countries related to the issue of nuclear power (such as Energoautomatizace-81, the trade show in Plovdiv, etc.).

In view of the fact that nuclear power plant construction is a very complicated and investment-intensive proposition, the importance of the coordinational activities of Interatomenergo is increasing. At the beginning of 1984, the following nuclear power generation capacities had been installed in the CEMA member countries: Bulgaria--1,760 megawatts; Hungary--440 megawatts; GDR--1,830 megawatts; Czechoslovakia--880 megawatts; USSR--17,483 megawatts; and Yugoslavia (not a CEMA member country, but participating in this association)--664 megawatts.

The results that have been achieved in this area to date have confirmed the importance and utility of Interatomenergo in fostering cooperation between socialist states in this sphere. It is likewise necessary, however, to make use of all of the potential and resources which the existence of this organization offers in the interest of the further effective development of the power generation industries of the CEMA member countries.

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NUCLEAR ENERGY DEVELOPMENT IN CSSR VIEWED

Prague SVET HOSPODARSTVI in Czech 1 Aug 84 pp 1, 2

[Article by Eng M. Cibula, CSc, State Planning Commission: "Development of Nuclear Power: Nuclear Power Plants To Provide 55 Percent of Electricity in the CSSR by the Year 2000"]

[Text] In the long-range projections for the Czechoslovak energy base, the share of nuclear power in the coverage of the primary energy requirements of the CSSR is projected to increase from the current 2.5 percent level to 15-17 percent by the year 2000. The principal factor in this development, one that will consume about 40 percent of all the resources allocated to the fuel and power sector, will be nuclear power plants providing the cogeneration of electricity and heat. These nuclear power plants should cover not only necessary increases in electricity consumption, but also compensate for lost production from plants currently burning domestic coal that will be phased out, thereby facilitating a substantial reduction in the generation of electricity and heat based on imported fossil fuels, primarily heating oils and natural gas.

The share of total Czechoslovak electricity production provided by nuclear power plants will increase from the current 8 percent to roughly 55 percent by the year 2000. Published projections for the European countries in the year 2000 estimate that nuclear power plants will account for 43 percent of total electricity production.

The greater emphasis placed on nuclear fuel utilization in Czechoslovak power projections in comparison with European and world trends comes from the necessity to compensate for expected declines in the availability of certain types of domestic and imported fossil fuels.

Specifically, the CSSR has gradually exhausted the possibilities for further increases in the extraction of energy coal used to generate electricity and heat. This coal is currently being extracted from substantially greater depths and under much more complex mining and geological conditions than 10 or 20 years ago. Moreover, at current extraction levels of energy coal, we are losing on an annual basis about 3 percent of our proven reserves. Under these conditions it is essential to develop efficient techniques for the utilization of so-called unproven, or projected, reserves of energy coal.

But even if we are successful in this there will not be enough coal available, given our projected requirements, to plan on a return to coal consumption such as is being planned in other countries that possess more favorable geological structures of their coal reserves.

The development of nuclear power has become, given Czechoslovak conditions, the only acceptable alternative for the future replacement of lost domestic coal resources and to reduce the dependence of our national economy on economically very expensive imports of fossil fuels.

Studies of the implementation of a conservation-oriented power generation sector based on the development of nuclear power indicate that, given the projected decline in coal extraction, the percentage of Czechoslovak consumption of primary energy provided by imported fossil fuels will drop from roughly the 42 percent reached in 1980 to less than 35 percent by the year 2000. Nuclear power will have an even more important impact on the structure of electricity production. Whereas in 1980, 86 percent of Czechoslovak electricity generation was accounted for by plants burning fossil fuels, by the year 2000 only about 35 percent of the electricity generated will be from fossil fuel plants. Over the same period (1980-2000) the percentage of electricity generated by nuclear plants is projected to increase from the current 6.1 percent to roughly 55 percent. By the end of the century, nuclear power generation facilities (electric power plants and heating plants) will eliminate about 19 million tons of standard fuel now provided by traditional energy sources from the Czechoslovak power balance. This is the fuel equivalent of about 55 million tons of energy coal or 17 billion cubic meters of natural gas.

Structural changes resulting from the development of nuclear power are very attractive economically. Studies indicate that although it will be necessary to count on a rapid increase in the acquisition cost of a unit of power both in traditional and nuclear power generation, both the relative developmental trends and the absolute differences in costs come down on the side of nuclear power. For instance, through the year 2000 it is expected that even with a reduction in total power generation and the removal of some less efficient plants from service, production costs at fossil-fuel-fired power plants will increase much more rapidly than those at nuclear plants. This results from the expected developmental trends of individual cost items, especially the fuel costs for traditional power plants and the investment costs of nuclear plants. There are the critical factors in the economic performance of these new power sources. If one assumes that current projections are accurate, the operation of each 1,000 megawatts of nuclear power plant capacity will result in annual savings of several hundreds of millions of korunas in comparison with electricity production at traditional power plants.

Czechoslovak nuclear generation capacity is being built with substantial technical and construction assistance from the USSR. Deliveries and the complete assembly of critical nuclear power plant equipment are assured through agreements covering production cooperation and specialization with the USSR and other CEMA countries. Under these contracts, the Skoda works

is producing 21 VVER 440 nuclear reactor units, 10 of which are allocated to the CSSR, with the remainder for delivery to other participating countries. Czechoslovak machine building and metallurgical firms are working intensively to set up the production capacity for components of the VVER 1000 reactor, which constitutes the primary innovative equipment for power plants to be constructed by the end of the century. Construction of the VVER 1000 reactor, which will be installed at Temelin nuclear power plant in Czechoslovakia (41,000 megawatt units), requires 37.2 percent less metal and 34.1 percent less concrete than the VVER 440 reactors. The VVER 1000 reactor is also 3 percent more energy efficient. An increase of 43 percent in the mean burn-up value of nuclear fuel in the VVER 1000 is an important economic consideration that will substantially moderate requirements for uranium raw material.

At present, only two nuclear power generating units are operational in the CSSR, both with Soviet-produced VVER 440 reactors. Both are at the V-1 power plant at Jaslovske Bohunice. During their operational history these units have proven to be highly stable, reliable and efficient, which has been evident in their exceeding of the originally projected annual electricity generation targets. In 1983 the V-1 power plant generated 6.15 billion kilowatt hours, and from the beginning of operation in December 1978 to the end of 1983 it has accounted for almost 24 billion kilowatt hours. These results, which in the last 4 years have contributed substantially to a reduction in the tautness of the Czechoslovak energy balance, have been achieved while exceeding the projected net energy efficiency of the unit by 1-2 percent and reducing projected levels of facility electric power consumption by 0.6 to 1.3 percent.

Between 1984 and 1986 at Jaslovské Bohunice and at Dukovany construction will be completed and the test operation begun of an additional 6 VVER 440 unit of Czechoslovak manufacture. Once these units are fully operational the Czechoslovak nuclear power industry will have enough capacity at its disposal to produce on an annual basis roughly as much electricity as was generated in our country by all the power plant facilities operating in 1960. This indicates how rapidly the Czechoslovak power engineering sector has been reoriented to a nuclear generation base. Increases in electricity generation by Czechoslovak nuclear power plants over the next 4 years should be about 4 times greater than increases in domestic energy consumption. This will make it possible gradually to reduce the generation of electricity in public steam power plants burning higher quality fuels by at least 10 billion kilowatt hours.

The important position of nuclear power in the further development of the CSSR power industry demands that questions related to construction projects be purposefully and comprehensively resolved. The choice of location for future nuclear power plants must take into account not only the needs of the electrification system, but also the requirements for its utilization in supplying heat to nearby industrial and urban agglomerations. The cogeneration of electricity and heat significantly improves the use of nuclear fuel by increasing the thermal efficiency of the cycle. Supplies of heat should be generated at all Czechoslovak nuclear power plants, even

from those which were built only for condensational operation. Data from the Skoda works indicate that the 220 megawatt turbines installed at the Jaslovske Bohunice and Dukovany power plants are capable of yielding 85 megawatts of heat power with a reduction in electricity generation output of only 11.9 megawatts. The improved models of these turbines which will be installed in the Mochovce power plant increase the potential extraction of heat power to 120 megawatts. The 1000-megawatt turbines which are being developed for the Temelin nulcear power plant will make it possible to extract 900 megawatts of thermal power. Concentrated sources of thermal power are satisfactorily utilized only if long-distance thermal pipelines several tens of kilometers in length will be built to service the surrounding area with a large number of users. The investment costs related to such pipelines are high, but they must be compared with the impact from savings on imported fuels and the construction and operation of traditional heating facilities. The first deliveries of heat from a nuclear power plant to a location not in its immediate vicinity will take place in 1987, when the Jaslovske Bohunice-Trnava heating pipeline will be completed. In connection with the development of nuclear power, the conditions are being established for the more widespread development of electroheat, i.e., the direct use of electricity to heat process waters or for heating.

The development of nuclear power and the related area of the production of nuclear power equipment is placing new demands on quality and on requirements for the planning and management of the cooperative efforts of all participating enterprises, organizations and sectors. Substantial resources have already been allocated to research and development and the production-technical base to facilitate this development. By also taking advantage of possibilities for cooperation with the USSR and other CEMA member countries, the essential internal and external conditions will be created for the implementation of the nuclear program as a strategic element of the development of the Czechoslovak power industry.

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CSO: 5100/3022

SUPERFROZEN ATOMIC NUCLEUS STUDIES VIEWED

Prague TECHNICKY TYDENNIK in Czech 14 Aug 84 p 3

[Interview with Doctor of Natural Sciences, Stanislav Safrata, CSc, by Oldrich Smejkal: "Atomic Nuclei in a Superrefrigerator"]

[Text] Doctor of Natural Science Stanislav Safrata, CSc, of the Czechoslovak Academy of Sciences [CSAV] Physics Institute in Prague is this year's Klement Gottwald State Prize laureate for his research on the properties of atomic nuclei through the technique of nuclear orientation at low temperatures. We have asked him some questions.

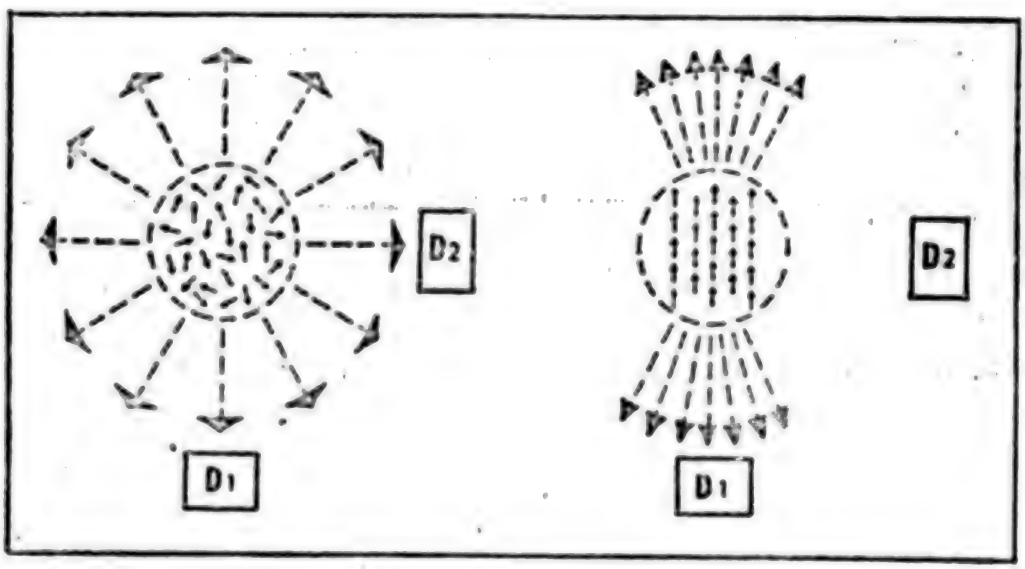
[Question] You were joined in this work by Eng Miroslav Finger, DrSc, and Dr Eng Zdenek Janout, CSc. Could you attempt, please, to acquaint the readers of TECHNICKY TYDENNIK with your work? Exactly what sorts of research results concerning the properties of atomic nuclei are involved here?

[Answer] A great deal of attention is being devoted worldwide to research on atomic nuclei. Various methodological approaches are employed to learn about their structure, properties, and the phenomena taking place within them. Measurements are taken of actual nuclear radiation, studies are conducted of the scattering of nuclear projectiles with which nuclei are bombarded in particle accelerators. Most of these experiments are conducted on groups of nuclei at room temperature. Under the influence of thermal movement, atomic nuclei are oriented in all directions. If one measures their radiation in these directions, one obtains in every instance equal intensities of alpha, beta and gamma radiation. If one bombards such a set from different directions with particles from an accelerator, one finds no difference between the different directions.

One can imagine a similar situation with a group of kittens playing in a basket. From a distance it appears that all of the kittens have paws, tails and heads on all sides of what amounts to a round body. If, however, they hear a signal from their mother that indicates, for instance, their favorite food, the kittens arrange themselves in the basket. Then, no matter which one you look at, it is easy to see that at one end they have heads, on the other tails, and down below paws. The kittens have been frozen into this position by the sound emanating from the direction of their mother.

For a set of atomic nuclei such a signal can be the combination of a magnetic field and very low temperatures. Nuclei also orient themselves in one direction. When one measures this one readily finds that they send more radiation in one direction than another and that under particle bombardment they have a round cross-section in one direction while in the perpendicular direction, for instance, they have an oval cross-section. These experimentally determined differences shed light on the internal structure of nuclei and the processes occurring within them. The findings significantly deepen our understanding and supplement other measurement strategies not based on nuclei.

The principal precondition for the orientation of a set of nuclei is met by cooling them to a temperature approaching absolute zero (-273.15 degrees Celsius). Such demanding special techniques could be applied only by using new cooling principles. We set these up in the Prague CSAV Physics Institute and in the Joint Nuclear Research Institute in Dubna near Moscow. There they became the basis of the so-called SPIN apparatus. In Dubna, moreover, samples containing the research nuclei had to be prepared, measurement systems had to be developed, and optimal variants determined for the course of the research work.



Lefthand Figure: Set of atomic nuclei at room temperature. Detector D_1 measures the same intensity of radiation as detector D_2. Righthand Figure: Set of oriented nuclei at a temperature near absolute zero, 0.01 Kelvin (-273 degrees Celsius). Detector D_1 measures significantly greater radiation intensity than D_2.

The trend toward research on cooled nuclei has brought many new findings. They are new to socialist countries and have been recognized by experts the world over.

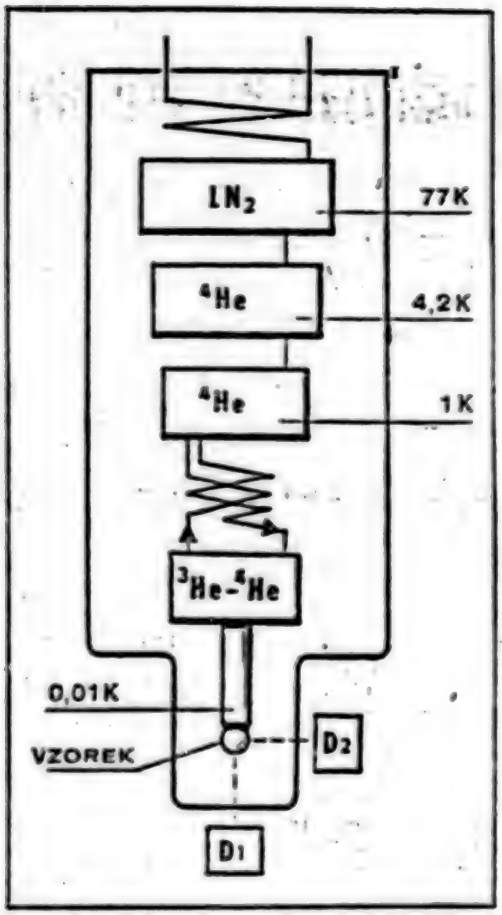


Diagram of apparatus for nucleus orientation. The sample is cooled to a temperature lower than -273 degrees Celsius in a chamber in which is dispersed the light isotope 3He in the heavier isotope 4He. Prior to entering the chamber the helium is supercooled by liquid helium in steps: to temperatures of 77 degrees Kelvin (-196 degrees Celsius), 4 2 degrees Kelvin (-269 degrees Celsius), and 1 degree Kelvin (-272 degrees Celsius).

[Question] Contemporary scientific work is unthinkable without a team approach. How, when and why did this cooperation occur?

[Answer] As you know, the Klement Gottwald State Prize was awarded to three individuals. Doctor of Natural Science Miroslav Finger, DrSc, is an employee of the mathematics and physics faculty of Charles University in Prague, and in recent years has worked at the Joint Nuclear Research Institute in Dubna. Docent Eng Zdenek Janout, CSc, is on the nuclear and physical engineering faculty of the Czech Institute of Technology in Prague, and has also frequently taken part in work at Dubna. I have at times also been a frequent guest at Dubna. Today, the development of the requisite research base is taking place mainly in the CSSR. This listing indicates how many worksites are working on this research. There are also other sites at colleges and CSAV and Slovak Academy of Sciences [SAV] institutes, as well as a large number of their employees. There are no other alternatives.

The demanding objectives require the experience, knowledge and efforts of low-temperature physicists and technicians, physicists specializing in solids, nuclear physicists, electronics experts and chemists. Without their participation such an extensive and demanding program, which began in 1960, could not be implemented.

[Question] The results of research should be practically implemented as soon as possible. Where and, mainly, how rapidly could the results of your research be applied?

[Answer] The objective of research on oriented nuclei at very low temperatures has been to gain new knowledge of the laws of nature governing phenomena in the core of the atomic nucleus. The results enrich human knowledge and add to the treasure chest of knowledge concerning nature. The new findings will be used to better utilize nuclear energy, to facilitate the use of new radioactive isotopes in various areas of public activity, etc. Research at very low temperatures also places maximum demands on substances, materials and structures as well as on the reliability of measurement instruments. The knowledge and experiments that we already possess is being used in various aspects of nontraditional modern technology. This is the greatest practical importance of the research, even though at present it is not possible to enumerate all of the production processes in which the results will be applied.

[Question] Would you share with us what the title of Klement Gottwald State Prize laureate means to you?

[Answer] It represents a great honor and recognition for long years of work. Above all, however, I accept it as confirmation of the deep understanding of the importance and purpose of scientific activity by our socialist society. I also consider it as an evaluation of the work of all of my colleagues, without whose assistance, support and advice this work would not have been completed.

9276
CSO: 5100/3022

BRIEFS

URANIUM ORE DEADLINE EXTENDED--Buenos Aires, 25 Sep (DYN)--President Raul Alfonsin has authorized the National Atomic Energy Commission, CNEA, to extend for 1 year the deadline for the return of three shipments of concentrated uranium ore that were lent to Nuclebras in 1980. This decision was announced today in Decree 3033, which was published in the GAZETTE and which was signed by the president, Economy Minister Bernardo Grinspun, and Foreign Minister Dante Caputo. In its whereas clauses, the decree indicates that "there is no problem in granting the request" submitted by the Brazilian enterprise because "internal uranium demands have been met." The lending of the third, fourth, and fifth shipments was ordered in Decree 2504, dated 5 December 1980. [Text] [Buenos Aires DYN in Spanish 1515 GMT 25 Sep 84]

CSO: 5100/2004

NUCLEAR COOPERATION ACCORD SIGNED WITH PRC

PY130225 Sao Paulo FOLHA DE SAO PAULO in Portuguese 12 Oct 84 p 7

[Text of PRC-Brzzilian Nuclear Cooperation Agreement signed in Bejing on 11 October]

[Text] Inspired by the friendship ties that join the Brazilian and the PRC people and by their common desire to foster bilateral cooperation;

Taking into account that the use of nuclear energy for peaceful purposes is an important factor for the promotion of socioeconomic development in Brazil and in the PRC;

Considering that the two countries have made an effort to meet the demands posed by their socioeconomic development through the use of nuclear energy;

Taking into account that both Brazil and the PRC are developing countries and that they are members of the International Atomic Energy Agency;

Convinced that close bilateral cooperation in the area of peaceful use of nuclear energy will contribute to the promotion of their friendly cooperation ties;

The governments of the Federative Republic of Brazil and of the PRC hereby agree to the following:

Article 1. The two parties shall cooperate in the area of peaceful use of nuclear energy in keeping with the terms of this accord and on the basis of mutual respect for each other's sovereignty, noninterference in each other's respective domestic affairs, equality, and mutual benefit.

Article 2. Under this accord, the two parties may cooperate in the following fields:

A. Basic research into the peaceful uses of nuclear energy;
B Research, design, construction, and operation of nuclear plants and research reactors;
C. Prospecting for and processing of minerals and uranium;
D. Production of fuel rods;
E. Research on nuclear safety regulations;
F. Production and application of radioactive isotopes;
G. Other fields of mutual interest.

Bilateral cooperation may be undertaken through any of the following activities:

A. Exchange and training of scientists and technicians;
B. Organization of symposia and seminars;
C. Rendering of consulting and technical services;
D. Exchange of scientific and technical information and reference material;
E. Other cooperation activities deemed appropriate by the two parties.

Article 3. The cooperation referred to in this accord shall be undertaken by the governments of the two parties or by the competent agencies designated by each government. The specific contents, the scope, and other details of the cooperation will be established in specific agreements to be formulated by the two parties.

Article 4. The two parties shall be entitled to freely use the information exchanged under the terms of this accord, except for information for which the supplying party has established conditions or reservations in connection with its use and dissemination.

Article 5. The two parties shall be entitled to transfer to each other, in keeping with the terms of this accord, nuclear material and equipment necessary for the implementation of their respective programs or joint programs on peaceful use of nuclear energy. However, the parties shall not be entitled to transfer such nuclear material and equipment outside the territory or jurisdiction of the recipient, unless they have agreed to do so.

Article 6. All material or equipment supplied by one of the parties to the other under this accord, and the material obtained as a result of the use of the transferred material or equipment, and the material used in equipment supplied under the terms of this accord shall be used only for peaceful purposes and shall not be used for the production or development of nuclear weapons or for any military objective. The two parties agree to ask the International Atomic Energy Agency to apply safeguards on the nuclear material or equipment transferred under the terms of this accord, or on the special fissionable material obtained from the sue of the above-mentioned material and equipment.

Article 7. Each party shall adopt the necessary measures to provide proper physical protection within its own territory to the nuclear material and equipment, in keeping with the terms of this accord.

Article 8. The two parties shall make all necessary efforts to support and promote scientific and technical cooperation among the different agencies and institutions of each country, in the area of the peaceful use of nuclear energy.

Article 9. The two parties shall adopt the necessary measures to facilitate the effective implementation of the present accord. At the request of any one of them, the two parties shall hold consultations on the implementation of the present accord, on the development of bilateral cooperation, and on other matters of mutual interest in connection with international cooperation in the area of peaceful uses of nuclear energy.

Article 10.

A. This accord shall come into force on the date of the second notification by the parties that all the respected formalities and legal steps necessary for its enforcement have been complied with, and shall remain in force over a period of 15 years. Subsequently, it will be automatically renewed each 5 years except in case one of the parties notifies the other in writing of its desire to denounce the accord 1 year before it expires.

B. The specific agreements referred to in article 3 of this accord shall not be affected by the termination of the accord. In case this accord is denounced, the terms of Articles 5, 6, and 7 shall remain in force while any material or equipment transferred under the terms of this accord remain in the territory or under the jurisdiction of the recipient country.

C. The two parties shall be entitled to amend this accord at any time through bilateral consultations. Any amendment shall come into force on the date of the second notification that the respective legal requirements have been met.

Written in Beijing, on 11 October 1984, in two originals, in Porguguese and Chinese, the two of them being equally authentic.

CSO: 5100/2010

BRIEFS

FIGUEIREDO ON NUCLEAR ENERGY--A modern country cannot disregard any source of energy, and therefore it must master the use of nuclear energy for peaceful purposes if it does not want to jeopardize its technological development. Therefore, I have decided to continue the nuclear energy program. In this regard, like other countries, we confronted serious problems in implementing this program because it involved technology in recent stages of research and high costs. But we had to and must do everything in our power to master it. However, in view of our immense hydroelectric potential, we had to decrease the pace of our nuclear program because of the eocnomic problems the country is confronting, but without jeopardizing investments that were already made in the sector. [President Joao Figueiredo address to the nation on 9 October from Brasilia--recorded] [Excerpt] [Brasilia Domestic Service in Portuguese 2330 GMT 9 Oct 84 PY]

NUCLEAR ACCORD WITH PRC--Itamaraty has released the text of the accord that calls for cooperation in the peaceful uses of nuclear energy that was signed today in Beijing between Brazil and the PRC. According to the agreement, the two countries can undertake basic research on the peaceful uses of nuclear energy, research projects, the construction and operation of nuclear plants and reactors, the prospecting for and processing of uranium, the manufacture of nuclear fuels, research into nuclear regulations and security, and the production and use of nuclear isotopes. The accord was signed by Brazilian Ambassador to Beijing Italo Zappa and it will be in force for 15 years. [Text] [Brasilia Domestic Service in Portuguese 2200 GMT 11 Oct 84 PY]

CSO: 5100/2008

BRIEFS

NUCLEAR COOPERATION AGREEMENT WITH SWITZERLAND--Cairo, 24 Sep (MENA)--Egypt and Switzerland today initialed an agreement for nuclear cooperation for peaceful purposes. The agreement was signed by Mahmud Mughrabi, head of the Nuclear Plant Authority, and Swiss Ambassador Jean Cuendet, with Electricity and Energy Minister Mahir Abazah attending the ceremony. The energy minister said the final signing of the agreement will (?take place) before the end of this year following the approval of both countries' parliaments. This agreement is similar to those Egypt has concluded with (?France), the FRG, Canada, and Belgium. [Text] [NC241958 Cairo MENA in Arabic 1536 GMT 24 Sep 84]

CSO: 5100/4601

GENERATION OF NUCLEAR POWER FROM THORIUM DESCRIBED

Tel Aviv NEWSVIEW in English No 37, 18 Sep 84 p 8

[Article by Joel Bainerman]

[Text] An Israeli physicist has developed a process for generating nuclear power which could supply the world with energy for the next 200 years.

Professor Alvin Radkowsky believes he has found the answer to a problem that has intrigued scientists since the creation of the atomic bomb: how to create nuclear energy using thorium, a radioactive metallic element three to four times as plentiful as uranium. Unlike uranium, thorium does not produce plutonium, so the technology used to produce nuclear power cannot be applied to the manufacture of atomic weapons.

Since thorium is not composed of atoms capable of splitting and causing the fission process required for nuclear generation, it was difficult to use in the past. However, by applying Radkowsky's process, the element previously used only in the storage of natural gas is combined with a small amount of uranium to render it suitable for use in nuclear reactors.

"Previously, the approach necessitated even more uranium than is used in conventional reactors," he explained. "I succeeded in starting with half the usual amount of uranium, and saving two-thirds of it at the end. Not only is it nonproliferative, but it costs less and can be used in existing power plants."

The development will greatly reduce the cost of nuclear energy, since uranium 235 – the only variety of the element that is fissionable – comprises only seven-tenths of one percent of all known uranium deposits, and reserves are not expected to last more than 50 years. With thorium in ample supply throughout the world, particularly in India and Brazil, Radkowsky believes his technique will extend the life span of nuclear power well into the twenty-second century.

The main body of research for the new process is scheduled to be completed by the end of 1986, along with the theory for a thorium core capable of producing 1,000 to 1,300 megawatts of electrical power. By 1988 the design and blueprints should be completed. By 1990 the zero power testing phase will be in effect, comprising a model of the thorium core, which will supply 200 watts of fission, ensuring the feasibility of the project. This phase will cost $200 million, with an additional $20 million for testing.

The third and final phase will begin in 1990, when a joint pilot-plant project will be initiated on the campuses of the Ben-Gurion and Tel Aviv Universities. Upon completion, existing nuclear plants will be sought in the United States which are either closed or about to close due to financial or other difficulties. The ability of the thorium core (estimated cost $200 to $250 million) to be incorporated into existing plants will mean a saving of billions of dollars. In addition, about $30 million per plant, per year will be saved as a result of fewer shutdowns, since refueling the thorium core will take a third of the time needed by that of the conventional uranium core.

Since thorium oxide retains less heat than uranium oxide, the core in the reactor will be easier to cool, reducing the likelihood of a loca (loss of coolant accident) and subsequent damage to the

core. Radkowsky pointed out that most of the trouble in the nuclear-energy field in the U.S. is caused by inadequacies in installation and human error in operation. While the U.S. averages five scrams (undesired shutdowns) per plant, per year, Japan averages only three-tenths of one scram per plant, per year.

Another advantage of the thorium core is that it leaves only one third of the waste produced by the standard uranium core – approximately one cubic meter of waste per annum. As none of this waste will contain plutonium, the vital ingredient for nuclear explosives, there will be no danger of terrorists obtaining potentially hazardous materials. Third World nations may thus benefit from a vast source of relatively cheap energy with no qualms on the part of the suppliers.

Serving as consultants on the process, which has been bought by New Power Technologies Incorporated of New York, are several American physicists, including Professor Edward Teller of the Lawrence Livermore Laboratory at the University of California; Nobel laureates Professor Hans Beathe of Cornell University and Professor Eugene Wigner of Princeton; Professor Herbert Goldstein, chairman of the nuclear engineering department at Columbia University.

Radkowsky is not new to the field of nuclear energy, nor is this his first contribution to energy conservation in that field. His career includes directing research projects for the International Atomic Energy Agency, the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy from 1950-1972. He made a major contribution while chief scientist of the Office of Naval Reactors. The difficulty of stockpiling volatile nuclear fuel on board naval vessels necessitated refueling every six weeks; by inventing a process whereby chemicals were added to the fuel, it was possible for neutrons to be absorbed at a much slower pace. As a result, nuclear-powered ships, especially submarines, were able to store enough fuel safely to permit them to extend their refueling period from six weeks to an astonishing 20 years – saving the U.S. billions of dollars and vastly enhancing the effectiveness of the U.S. Navy.

CSO: 5100/4501

COMPANY OFFICIAL CITED ON PRC NUCLEAR POWER PLANTS

JN200744 Amman JORDAN TIMES in English 19 Sep 84 p 3

[Article by Rami G. Khuri]

[Text] Amman -- A Jordanian commerical group is trying to pull off a major international business coup by intermediating a $7 billion turnkey deal to provide the People's Republic of China with four nuclear power plants.

The Amman-based United Trading Group is in the midst of wide-ranging and urgent talks with nuclear power industry companies in the United States and eight West European countries, aiming to put together several consortia to build the four nuclear power plants.

UTG director and senior executive, Mr Radwan Hajjar, who is president of the UTG-owned Trans Orient Engineering and Construction Company, said in an interview with the *JORDAN TIMES* earlier this week that another UTG-owned company, the United Trading Company, signed a firm contract with the Chinese Water Resources and Electric Power Ministry on July 31.

The contract, he says, names the United Trading Company (UTC) as turnkey contractors/general managers for the four power plants. He adds, however, that UTC has no previous experience in nuclear engineering, and is only playing an intermediary role between the Western suppliers of the technology and the Chinese government.

"This is not a letter of intent or a proposal that we have. This is a signed contract, in which the Chinese government has put down technical and financial specifications for these four nuclear power plants," Mr Hajjar said.

UTC would bring together the Western Companies that have the nuclear technology, the suppliers of required construction and technical materials, and the contractors who would actually build the power plants. Mr Hajjar estimates the Chinese themselves could do about half of the civil works for the plants, but need foreign expertise for the other half.

UTC would subcontract much of the construction management work to companies that have the necessary expertise in the design and supervision of nuclear engineering projects, while itself playing more of a coordinating role among the many different firms that would have to be involved in such a large scheme.

Mr Hajjar said that as soon as UTC puts together a package of Western supplier, contractors and financiers on terms that meet China's specifications, work can start on the actual construction of the plants.

UTC has already had talks on the project with three American firms, as well as others in Great Britain, France, West Germany, Italy, Spain, Sweden, Switzerland and Austria.

The four power plants to be built are the twin 900 megawatt (mw) Guangdong power plant, a twin 900 mw plant at Shandong, a twin 900 mw plant at Hunan and a single 700 mw plant at Fujian. Another single 700 mw plant could be added to the contract at a later stage, Mr Hajjar said.

The Guangdong plant has been under negotiation for nearly four years with General Electric Company of the U.K. and France's Framatome, whose share of the work is not affected by the deal with the UTC, Mr Hajjar said. UTC would provide the additional elements of that plant that have not been discussed with the British and French firms, and overall construction management.

The UTC signed the turnkey contract on a cost plus basis. Its job will be both to put together the package of suppliers, contractors and financiers, and to play a role in the overall coordination and project management.

UTC hopes a package of companies for one of the twin 900 mw stations can be put together by the end of the year, with construction starting soon after. Mr Hajjar expects the construction of the power stations will have to be phased, with a year or two separating the start-up of each plant. Total construction time for the four plants is therefore now estimated at between 10 and 15 years.

Most people here and abroad reacted with considerable surprise, and some scepticism, at the reports of the deal, first published in the *JERUSALEM STAR* newspaper here in early September. While many interested observers are still unsure of the precise nature of the arrangement the UTC has struck with Beijing ("It may be something between a letter of intent and a final contract," one source said), Western diplomatic sources here and in Europe tend to confirm that the UTC contract with the Chinese Government is just what the company claims it to be.

The obvious question on most people's minds has been: Why would the Chinese choose a Jordanian company with no previous experience in nuclear engineering, or in putting together huge international consortia of this size, to attempt such an ambitious undertaking?

Mr Hajjar replies: "Our Hong Kong office saw an opportunity to help the Chinese get around the long delays they had experienced in their negotiations with the Europeans for the nuclear plants. We made them an offer, and they accepted it. The Chinese want nuclear power for their industrial expansion plans, and they want it fast. This was a way for them to send a message to the European companies and the Europeans seem to have received it."

The Chinese are known to be impatient over the long time it is taking them to finalise deals for nuclear power plants with Western suppliers. Some projects have been in the negotiation phase for between four and eight years.

Mr Hajjar notes that the initiative for the deal came from UTG and not from the Chinese.

"We initiated the proposal, and the Chinese seemed to like it. We offered a possible means of speeding things up for them and of breaking the closed circle that seems to exist between China and the Western nuclear power industry," Mr Hajjar said.

Financing is expected to play a major role in determining who wins the big contracts to supply the technology, materials and contracting for the power plants. The Chinese want less than commercial rates, and hope to repay over 15 years with repayments starting only after the start-up of the plants.

The Chinese Government wishes to secure concessionary loans at a fixed interest rate. Mr Hajjar would not reveal the financing rates the Chinese have requested, though banking sources say a rate of around seven to seven and a half per cent is about the lowest that could be reasonably expected, if financing is done in low interest rate currencies such as German marks, Swiss francs or Japanese yen. Dollar financing would be considerably costlier, as would dollar forward contracts that banks may wish to buy to offset the exchange rate risk inherent in such a long-term credit.

Therefore, the assumption is that the suppliers of the nuclear technology and material would persuade their governments to play a major role in providing subsidized loans to finance the power plant.

Egypt recently secured seven per cent financing for some of its new power plants, and it seems China is aiming for similar financing terms. Mr Hajjar said he did not expect Arab institutions to be particularly involved in providing the finance, whose concessionary terms mean it will have to come from Western banks and governments from the home countries of the companies involved in the final deals. Mr Hajjar says that UTC has had a "favourable response from the banks", and that "we have not run into any insurmountable problems to date. There are solutions to all the financing aspects of the scheme that have been discussed."

The contract signed with the Chinese Government includes a Bank of China guarantee of the financing that it lined up for the power plants, if the interest rate meet Beijing specifications. Since the contract was signed, the Chinese Government seems to have started reassessing whether the financial guarantees should be provided by the Bank of China, or by the provincial banks in the provinces where the plants will be built.

"This is a question for the Chinese to decide upon internally," Mr Hajjar said. "The important thing for us is that we have the commitment of the Government of China to guarantee the loans that are raised. Whether the Bank of China or the provincial banks provide the guarantee is an internal matter for the Chinese to resolve."

The UTG is a privately owned, diversified trading and contracting group based in Amman, with 49 subsidiaries or joint ventures in 19 countries. It has major interests in contracting, insurance, commodities trading, food production, oil drilling, and the travel business. The UTG first did business with China about five years ago when an exploratory trip to Beijing eventually led to several deals that involved the trading of general commodities.

CSO: 5100/4502

ANTI-PAKISTAN PROPAGANDA DECRIED

GF291702 Karachi JASARAT in Urdu 16 Sep 84 p 3

[Editorial: "The Propaganda About the Pakistan Atomic Bomb"]

[Text] The U.S. CIA spy organization has informed U.S. officials that military advisors to Indian Prime Minister Indira Gandhi are putting pressure on her for India to attack the atomic energy plant at Kahuta in Pakistan. In this matter Israel is providing India with the necessary know-how to plan the proposed attack.

A broadcast by U.S. television on this matter shows the gravity of the situation. It shows that India has already found an excuse for such aggression by saying that since Pakistan is building an atomic bomb, it should be punished.

Unfortunately propaganda about Pakistan's atomic bomb has been ongoing. Pakistan's assurances denying the allegation are hardly being accepted in Europe and the United States though Pakistan has repeatedly said that it is not making the bomb nor is it engaged in trying to build one. However, under pressure and propaganda by the Zionist lobby, the news on the "Islamic bomb" is being magnified. Efforts are also being made to stop aid to Pakistan as a consequence of such propaganda.

However, the bogy of a Pakistani atomic bomb is nothing new. Much before this the United States had withdrawn its aid from Mr Bhutto on the same grounds. The United States was then under the impression that Mr Bhutto, in collusion with Libya and certain other countries of the Arab world, was engaged in producing a bomb. Now even if Mr Bhutto is no more, certain circles in the United States still believe that Pakistan is continuing its old game. Under these circumstances it is not difficult to understand that India would rather use the opportunity and may try to get a green light to attack Pakistan's atomic center.

There are still many powerful people in the United States who fear that once Pakistan succeeds in making a bomb, it will be used not only against India but it may be used by certain Arab countries against Israel as a powerful lever. When Pakistan has built a bomb, it would adversely affect U.S. interests all over the world. An atomic bomb in the hands of Pakistan is in fact hated by both the United States and the USSR equally. However, these are the very circumstances India wants to exploit to its own advantage.

Because of this, our rulers must on the one hand assure the United States that Pakistan is not making the bomb and on the other hand convince the United States that if this state of doubt continues against Pakistan's peaceful intentions, India will probably take advantage of the hostile feelings against Pakistan.

There is one point that should be kept in mind. The United States or the Western world for that matter is hardly worried about the atomic preparations of India. Somehow they believe that an atomic bomb in India is in responsible hands and will never be used against Israel. But in Pakistan's case, the opinion is quite the opposite. To change that attitude, both in the United States and the Western world, much work and propaganda will be needed. It will take some effort to make the U.S. and Western leaders change their attitudes toward Pakistan's real intentions. If this is not done in time, India will enlist backing for its aggression and might well succeed. When this happens, it will be fatal to our interests.

CSO: 4656/5

STRONG SECURITY MEASURES FOR NUCLEAR INSTALLATIONS URGED

GF021538 Rawalpindi HAIDAR in Urdu 18 Sep 84 p 3

[Editorial: "Nuclear installations--Fears and Security Measures"]

[Excerpts] U.S. intelligence experts on South Asian affairs have informed Senate members of possibilities of an Indian attack on Pakistan's nuclear installations and that India is enlisting Israeli support for the same.

Such information has emanated from U.S. sources and there is no reason that it should be considered baseless or should be ignored as fabrication. The exigency demands that those who are responsible for our defense arrangements take a fresh look at existing security arrangements for our nuclear installations and if there is any loophole it should be taken care of immediately. Our other suggestion is that we should be ready for any reciprocal action and we should make it clear through diplomatic channels that if India is not ready to waive its insane plans, not a single Indian nuclear installation will be left standing.

The only way to avert danger and to bring the opponent to his senses is to make it clear that a brick will be returned with a boulder. We hope that those at the helm of affairs will pay maximum attention to defense arrangements and will use all diplomatic means to make India aware of the dangerous repercussions of its nefarious designs so that the Indian people force their leaders to adopt a sane and compromising policy.

The need of the hour is to drive home to the Indian people that they will suffer untold destruction due to the dangerous policy of their government. In this regard, our Ministry of Information and Broadcasting should brief the radio and television authorities on the same. As regards alleged Indian-Israeli collusion, we would like to inform our Foreign Ministry that if Israel ever connives with India in an attack on our nuclear installations, the United States will be held totally responsible and Pakistan will be justified in revising its relations with the United States.

In our opinion it will be appropriate to soften the Soviet Union's mood vis-a-vis Pakistan if our approach toward the Afghan issue could be more flexible so that the Soviet Union should not feel the need to instigate India against Pakistan and should be willing to use its influence to initiate some sort of talks between New Delhi and Islamabad. We are positive that a change in our government's policy on Afghanistan can motivate the Soviet Union to play a more positive role in the improvement of the Indo-Pakistan relations.

CSO: 4656/5

TALKS WITH INDIA ON NUCLEAR ISSUE PROPOSED

GF011201 Rawalpindi HAIDAR in Urdu 21 Sep 84 p 3

[Editorial: "Advice for the Indian Leaders"]

[Text] President Ziaul Haq was answering correspondents' questions at the opening of a seminar in Islamabad. He said that Pakistan had made all possible arrangements for the safety at its nuclear installations, which have been set up for peaceful purposes, and that details of the report alleging that India was preparing to attack its nuclear installations have also been requested.

We hope that there will be no truth in these allegations and India will not resort to such actions which would be a precursor to a full-fledged war. The president's reassurance on the security of the nuclear installations is heartening and the demanding of details and clarification from the Government of India is an indication of the fact that the president is ready to discuss any misconception regarding the objectives of its nuclear programs. We laud the President's stand and we request the Indira government to revise its decision on a postponement of bilateral talks until after the elections and to agree that negotiations will be mutually advantageous. All those problems that are at present straining Indo-Pakistan relations will be more easily resolved at the conference table by the two parties.

We feel that Mrs Gandhi should pay more attention to improving relations with Pakistan before the elections in her country if she wishes to win the approval of her own compatriots for such a constructive attitude. This will also brighten the prospects of her election campaign because the Indian people also desire peace.

We are optimistic that the clarification demanded by Pakistan regarding a possible attack on Pakistan's nuclear installation will be answered in a reassuring manner, and that it will be accompanied by New Delhi's positive reply on talks with Islamabad.

CSO: 4656/5

KOEBERG OUTPUT MATCHES 5 POWER PLANTS

Johannesburg INDUSTRIAL WEEK in English 4 Sep 84 p 4

[Text]

SET ONE of Koeberg nuclear power station is now in commercial use. The French contractors, Framatome, Alsthom-Atlantique and Framatog, have formally handed over the reactor, turbo-generator set and associated civil works to Escom.

"Tests with the No 1 reactor and its generator set were completed successfully on July 21. Koeberg One is now in commercial use and plays an important part in the Escom power system," says the chairman, Jan Smith.

Fuel was loaded into the first reactor on October 29, 1983. Criticality was achieved on March 14, 1984.

Since then tests have been conducted at progressively increased power levels up to full power output. Each step was closely monitored by the Atomic Energy Corporation which had to approve the status of the plant.

An interesting feature of this station is the fact that the time taken to complete the tests from initial criticality through to commercial operation is as good as the best times achieved in the domestic programme in France.

In June the Atomic Energy Corporation gave permission for the output of the first set to be increased to 100%. This allowed the final phase of the test programme to be completed followed by an extended period of operation at full power.

In early August the licence of the reactor to go into commercial operation was issued. At all licensing stages the Council for Nuclear Safety — an independent watchdog body, appointed under the Nuclear Energy Act to look after the interest of the public — had also to be satisfied.

The atomic set will feed 922MW into the Escom network. From April when the set was first synchronised with the network, the set has produced 1 500-million KWH of electricity.

This is 800-million KWH more than the combined power output during 1984 of Escom's five power stations in the Western and Eastern Cape.

CSO: 5100/2

BRIEFS

KOEBERG POWER SUPPLY--The Koeberg nuclear power station has generated 2.5 billion kilowatt hours of power since April, which would have required nearly 6 billion liters of water at a coal power station. To generate the power, the power station used only 165 kg of uranium, which is .22 percent of the total quantity of uranium in the reactor. If coal had been used, 1.25 million metric tons would have been needed. [Text] [Johannesburg Domestic Service in Afrikaans 1400 GMT 28 Sep 84]

CSO: 5100/1

POLL FINDS FEWER OPPOSED TO NUCLEAR POWER EXPANSION

Helsinki HELSINGIN SANOMAT in Finnish 20 Sep 84 p 3

[Article by Renny Jokelin: "New Opinion Poll: Opposition to Nuclear Power Has Decreased in Finland"]

[Text] A clear majority of Finns continues to take a negative stand on the construction of a fifth nuclear power plant. According to an interview survey conducted in August, 47 percent of Finns oppose a new nuclear power plant.

Twenty-seven percent of those who answered were in favor of nuclear power, and 22 percent thought there were both positive reasons for and negative reasons against the construction of a fifth nuclear power plant.

The survey was conducted by Finnish Gallup and funded by the Finnish Power Plant Association. Imatran Voima [Imatra's Power], Inc, and Teollisuuden Voima [Industry's Power], Inc, which own nuclear power plants in Finland, are behind the power plant association.

The last time the association examined the views of Finns on nuclear power was in March, when 61 percent were opponents and 23 percent were supporters. Nearly a year ago, in November, 55 percent of those who responded stated that they opposed a fifth nuclear power plant and 24 percent supported it. Eighteen percent were uncommitted.

Antti Hanelius, managing director of the power plant association, thinks that the increase in those who take a positive stand derives from eruption of the acid rain debate in the spring. Finnish Gallup examined the opinions of 500 persons.

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CSO: 5100/2595

IMPROVED OPERATION REPORTED FOR LOVIISA POWER REACTORS

Helsinki HELSINGIN SANOMAT in Finnish 2 Sep 84 p 38

[Article: "Loviisa 1 Started Up After Yearly Maintenance; Suction Apparatus Fell into Reactor"]

[Text] Loviisa (HELSINGIN SANOMAT)--The number one unit of the Loviisa nuclear power plant has been started up after yearly maintenance. Maintenance work on Loviisa 2 will begin in the next few days, as soon as it is established that Loviisa 1 is working flawlessly, it is reported from Imatran Voima [Imatra's Power].

The number one unit's yearly maintenance, which lasted 1 1/2 months, took even less time than reckoned, although measures to block off the metal delayed the beginning of work.

Among the most noteworthy of the yearly maintenance's early blunders was the dropping of a suction apparatus weighing over 100 kilograms into the reactor. The suction apparatus was on the edge of the reactor when the cables which move the television camera hooked onto it and pulled the suction apparatus into the reactor. There are about 10 meters of water in the reactor. At first the suction apparatus remained in the middle supported by the cables, but finally it fell to the bottom of the reactor receptacle.

The heavy suction apparatus scratched the pressure box but, according to investigations, it caused no noteworthy damage. The suction apparatus and its parts were fished up in no time. According to operations chief Jussi Helske, some mild swearing occurred during the situation. Large objects must obviously be tied down in the future so that similar damage does not take place, states Helske.

The density of the radioactive zone was inspected at Loviisa 1 during the extensive yearly maintenance. The places were found to be in order.

Changes were made on the reactor's emergency cooling side so that in an emergency cooling situation the re ctor is no longer flooded with cooling water, but rather the amount of water can be apportioned.

During the yearly maintenance the plant's radiation level remained lower than in earlier yearly maintenance performances, according to radiation

protection chief Bjorn Wahlstrom. The reasons are an improved water chemistry and skillful use of the plant. They have been able to keep the water of the radioactive zone quite pure with chemical methods, and the plant is used in such a way that the radiation's source, the fuel, has remained undamaged.

There was also some bungling in radiation matters, since two workers inhaled radioactive dust during the yearly maintenance. Fortunately, the doses remained small. One of the workers received 200 millirems and the other worker 100 millirems; the permitted annual dose is 5,000 millirems.

The one who received the larger dose will continue to be in the care of the Radiation Protection Center. For scientific purposes an examination is being conducted on the man, who is leaving to take up his studies and whose work will have nothing to do with radiation.

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ENERGY MINISTER REJECTS PROPOSAL FOR NEW NUCLEAR PLEBISCITE

Helsinki HELSINGIN SANOMAT in Finnish 20 Sep 84 p 29

[Article by Renny Jokelin: "Sweden's Energy Minister Birgitta Dahl: No New Vote on Nuclear Power"]

[Text] Swedish Energy Minister Birgitta Dahl flatly turned down requests to arrange a new plebiscite on nuclear power in Sweden. Dahl said in Stockholm on Wednesday that the country's government and Social Democratic Party is committed to the plebiscite held in 1980 and will carry it out.

The Swedish Right and representatives of trade and industry have hungered more and more strongly in recent months for a new vote. They feel that Sweden cannot afford to abandon nuclear power by the year 2010, as the majority of the plebiscite requested and on the basis of which the Parliament has made its decisions.

Dahl emphasizes that the Swedes would lose their faith in politics and politicians if a new vote would have to be taken after such a short time. Dahl also considers the debate of the years 1979-1980 so divisive that the nation would not easily endure another one like it.

A plebiscite on nuclear power was held in Sweden in March of 1980, when nearly two-thirds of the voters gave some kind of yes-response to nuclear power plants. There were three courses of action to choose among, and the middle one was the victor. Yes-votes received 59 percent altogether and no-votes 39 percent. The remainder did not take a stand. Nineteen percent actually supported nuclear power without restrictions.

Minister Dahl and the Social Democrats have come forth with inventions introduced by new technology for energy production after the abandonment of nuclear power.

The Social Democratic Party is discussing energy questions at its party congress in Stockholm's Folkets hus on Thursday. Along with gradual abandonment of nuclear power, the Social Democrats support termination of the country's oil dependence at a rapid clip. The party may also be ready to harness some of the big free rivers of northern Sweden.

In Sweden there are currently 12 nuclear power plants, of which the last two are being readied for operation right now in Oskarshamn and Forsmark.

The debate on nuclear power in Sweden is certainly not dead and buried once and for all, since the Parliament can nullify its earlier decisions at any time whatsoever. The Social Democrats have also left the door open. Dahl says that in 1980 the Swedes clearly approved the use of nuclear power. Dahl also feels that the issue of nuclear waste is being tended to. Rock caves are being prepared in Sweden for nuclear wastes of low and high activity.

Sweden is one of the world's countries where nuclear power is used most. Forty percent of the country's electricity comes from nuclear power plants and the remainder from hydroelectric power stations. When all 12 reactors are functioning, the share of nuclear power rises above 50 percent.

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